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AUTHOR	Rice, Marion J.
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ABSTRACT

This paper reports research conducted with materials from the Anthropology Curriculum Project, which follows a substantive model, to answer the question: was pupil achievement in anthropology primarily a functon of the trained teacher, or a function of the materials used by any teacher in anthropology. A quasi-experimental design involving intact classes, grades 1-5, was used. Half the classes were taught by teachers who received a special six-week anthropological and methodological training institute. Teachers were volunteers, pretests and posttests were used and replicated. No significant gains were identified by t-tests of mean differences or F-ratios from analysis of variance. The author develops a theoretical consideration of four teaching factors to explain why special training in project materials does not enhance pupil performance. (VLW)

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THE EFFECTIVENESS OF TEACHER TRAINING AS MEASURED BY PUPIL PERFORMANCE

UNIVERSITY OF GEORGIA

by

Marion J. Rice
Professor of Social Science Education

A paper read at the Association of University Professors of Social Science Education at the 50th Annual Meeting of the National Council for the Social Studies
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Marion J. Rice
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November 1970

The purpose of this paper is to question the common assumption that pre- or in-service teacher training is a prerequisite to successful use of innovative material, as measured by pupil performance defined in measureable terms of learning increments. This prevailing assumption is expressed by a New York Elementary Curriculum Coordinator who in November 1968 wrote "To do a satisfactory job, teaching this material (of the Georgia Anthropology Project), an in-service course of at least a semester's duration is a must." Data will be offered, based on a large sample of users, to indicate that no educationally significant differences have occurred in the performance of pupils taught the materials by trained as compared with untrained teachers. A theoretical explanation will be given to show that one should not expect teacher training in a specific project to make educationally significant differences, where the product is pupil performance. However, it is recognized in projects where the emphasis is on the teaching process rather than learning outcomes a different product might be expected for which teacher training is more relevant in terms of desired teacher behavior.

For purposes of project classification, the Anthropology Curriculum Project at Georgia follows a substantive model. In a substantive model, the curriculum emphasis is on the content and the structure of the materials. The object is to provide the basis for minimum outcomes, as measured by pupil performance, irrespective of teacher ability or method. Change in pupil behavior is viewed primarily as a result of the interaction of material and learner, with the facilitating function of the teacher regarded primarily as an intervening rather than as a treatment variable.

This model, excluding such related variables as school and pupil characteristics, may be presented in a linear schema as follows:

Treatment Variable	Intervening Variable	Performance Outcome
Materials & Content	(Teacher) (Behavior)	Pupil Cognitive Increment

In practical classroom application, theoretical curriculum structures regress toward conventional teacher interpretations. A pure substantive model does not exist in practice.

At the outset, the Anthropology Curriculum Project (and subsequently the satellite Geography Curriculum Project) adopted the substantive model for curriculum development. From the standpoint of the learner, the assumption was made that the most direct way to improve the cognitive performance of elementary children was to involve them in content structured according to a discipline. From the standpoint of the teacher, it was assumed that few elementary teachers had or would have systematic instruction in anthropology. It was therefore decided that a fundamental attribute of the materials was classroom utility. Classroom utility was defined as the ability of elementary teachers to use the materials to bring about cognitive growth in anthropology without special training in the subject matter of anthropology or in the use of the project material.

The issue of teacher training was therefore of utmost significance from the conceptualization of the project. Was pupil achievement in anthropology primarily a function of the trained teacher, or a function of the materials used by any teacher in anthropology.

To answer this question, a quasi-experimental design was utilized involving intact classes. Half of the classes would be taught by teachers who would receive special anthropological and methodological training in a six week institute. The other classes would be taught by teachers in the same schools who would simply receive the material a few days prior to instruction and use the various materials in the best manner they saw fit.

Now who were these teachers? First of all, they were volunteers. Years of teaching experience ranged from none to over twenty. Level of teacher certification ranged from two-year emergency to sixth-year specialist. They came from rural, suburban, and inner city schools. Over one-third of the teachers were black, at a time when integration was token. Rating of teacher effectiveness by principals in informal

conversation ranged from poor to excellent. Several of the trained teachers failed to make satisfactory grades on the anthropology courses but, for reasons of project management, were assigned an audit rather than failing grade. The experimental, i.e., trained teachers did not constitute by any stretch of the imagination a homogeneous group of master teachers. The control, i.e., untrained teachers, came from the same schools and had similar characteristics, but they were not paired with the trained teachers.

It is important to bear in mind the characteristics of the trained population. It frequently happens that in the selection process, as in NSF and EPDA institutes, superior teachers are identified for training. It is likely that all the desirable attributes attributed to training are inherent in these individuals without additional training. I merely make this point to emphasize that our experimental teachers were not a group of super-teachers before training, so that there was ample opportunity for training in anthropology and methodology to make a difference.

What was the curriculum for teacher training? The training consisted of a six-week institute, divided into "knowledge" and "application" components. The knowledge component was under the direction of Co-Director Wilfrid C. Bailey, and consisted of two courses in introductory anthropology with 90 hours of classroom instruction leading to ten hours of college credit. The anthropology training always consisted of a general course and a unit specific course. The general course was a survey of anthropology, similar to the standard introductory college course in anthropology. The unit specific course related to the topic of the new unit to be introduced, such as "Cultural Anthropology" for the first and fourth grade units "Concept of Culture." All anthropology courses were taught by staff of the anthropology department, but the needs of the teachers were considered. For example, the projected unit outline was available to both instructor and teachers, and an attempt was made to tie in the subject matter of the anthropology courses to the cognitive needs of the students.

The application part of the training was under the direction of Dr. Oscar Jarvis[1], a specialist in elementary curriculum and teaching. In the workshop, students used the projected unit outline to identify and select significant concepts; review and annotate related teaching films, filmstrips, books, and pictures; compile suggested activities; and simulate various kinds of teaching. Many of the teacher suggestions

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[1]Dr. Jarvis is now head of the Division of Curriculum and Teaching, University of Texas, El Paso.

were incorporated into the subsequent teaching guide. The trained teachers not only received subject training in anthropology but had the advantage of planning how unit concepts were to be implemented in the classroom. They did not, however, have the actual pupil texts, which were generally still being developed or planned at the time the institute was held. The trained teachers nevertheless had been introduced to the general subject matter of anthropology, and had participated in the planning of classroom teaching procedures.

In contrast, the untrained teacher merely received the unit material. It was sent out at the same time the material was mailed to the trained teacher---a few days before the unit was to be initiated. The untrained teacher was expected to establish his own cognitive frame of reference, interpret how the materials might be used, and develop his own classroom procedures. The untrained teacher had the same materials for teaching the unit as the trained teacher. These materials consisted of ethnographic essays subject specific to the unit, teacher guide, pupil picture book or text, and pre- and post-tests.

What observations of use of materials were made during unit teaching? The project did not have the manpower to conduct systematic classroom observation, and no attempt was made to provide inservice follow up to either trained or untrained teachers. Both the trained and untrained teachers were on their own as far as using the materials. There were some classroom observations, primarily on invitation of the teachers. Let us simply say that we saw instances of what we judged to be both poor and excellent instances of material use by both untrained and trained teachers. Both trained and untrained teachers tended to depend on the teacher guide for suggested pupil activities, and there tended to be tremendous similarity between schools in types of pupil activities. Most teachers reverted to a demonstration rather than teaching type of lesson on staff visits, and it was difficult to relate teaching style to pupil performance.

What were the results of pupil performance on the specially constructed anthropology tests? Original test development and evaluation was under the direction of Dr. Warren Findley and subsequently under the direction of Dr. Albert J. Kingston, both project staff members from the department of educational psychology. Test revision after first year use increased test validity and reliability. The original test forms were nevertheless judged adequate to appraise the significance of gains as measured by pre- and post-tests and the significance of differences in gains by either t-tests of mean differences or F-ratios from analysis of variance.

There were two major analyses, one by Greene in 1965 and a replication by Wash in 1966. The 1967 analysis was not completed.

The 1965 study involved 59 teachers and 1,623 pupils in Grades 1 and 4. The 1966 study involved 72 teachers and 2,183 pupils in Grades 1, 2 - 4, and 5. In both studies, the number of untrained teachers exceeded the number of trained teachers, and the number of children taught by untrained teachers was much larger. The number of trained teachers was limited by the number of stipends----14 per grade per year---whereas there was no limitation on untrained teachers, except willingness to participate and cost of materials. The project never experienced difficulty in finding untrained teachers willing to use the materials. As the project aged, the number of trained teachers declined in proportion to the number of untrained teachers as a result of resignation, marriage, and transfer.

I do not propose here to follow the convention of providing elaborate statistical tables. For the statistically minded, I shall be happy to provide on request the most pertinent tables from the standpoint of statistical analysis. Suffice it to say here that Greene applied two different statistical procedures---application of t-ratio of difference in mean gains and analysis of variance with F-ratio to difference in post test scores of trained and untrained teachers. The t-ratio indicated no statistically significant difference, but the F-ratio was significant at the .01 level for scores on three of the post-test forms for pupils taught by trained teachers. Wash, unlike Greene, did not report data for differences in mean gains by group but merely reported least-squares analysis of variance data by post-test scores by form of test group. In the Wash study, statistically significant differences at the .01 level were found in favor of the achievement of pupils taught by trained teachers in two of the six groups, those administered form B as the post-test in grades 4 and 5. No differences were found in the other groups.

Far more important than the statistical analysis are the mean scores themselves. A statistical difference may have no educational significance. As Wash indicates, a cautious interpretation of the test results would say that we do not know the special effect of training. However, the project staff has interpreted the data to indicate that, as a matter of educational significance, training of teachers appears to make no difference in the performance of pupils, as shown by the Tables 1 and 2.

In the Greene study, differences in post-test means of untrained teachers was slightly less than that of trained teachers in both grades 1 and 4. In no case, however, did the difference exceed half of one raw score.

TABLE 1

Post-Test Results, 1965 (from Greene)

	Grade 1		Grade 4	
	T	UT	T	UT
N Teachers	12	18	13	16
N Pupils	348	490	363	422
Mean, Post Test	9.1	8.6	13.6	13.3

TABLE 2

Post-Test Means, 1966 (from Wash)

	Pupil N		Form A		Form B	
	T	UT	T	UT	T	UT
Grade 1	155	489	14.11	14.98	11.00	11.23
Grade 2	118	412	16.80	16.86	18.57	18.19
Grade 4	152	275	18.13	18.01	22.56	20.83
Grade 5	251	331	24.91	24.44	26.15	24.93
Total	676	1,507				

Similar small differences are shown in the Wash study, except in the cases of Form B, Grades 4 and 5, where the difference favored pupils taught by trained teachers by 1.73 and 1.22 scores respectively.

Our most immediate reaction, in light of the other class data, was that there was some artifact of Grade 4 and 5 Forms B which favored pupils taught by trained teachers, but we were never able to identify the reason.

A number of interpretations can be placed on these data which show no positive advantage for increments in pupil performance taught by trained as compared with those taught by untrained teachers.

The first conclusion that might be reached is that the teacher training was deficient. We make no claim that the training was excellent or superior. We do think, however, that there was a concerted attempt to do three things: provide relevant knowledge, coordinate knowledge and methodology, and make practical applications to unit teaching. The absence of teacher performance data is unfortunate, but a policy decision was made to keep teacher testing and evaluation to a minimum. This was done on the assumption that what we wanted to evaluate was pupil performance, not teacher performance, and that an emphasis on teacher evaluation would be threatening to teachers in a longitudinal study. Pupil performance, according to Greene, was not significantly correlated to three teacher variables, all related to general rather than performance data. These three factors were: grade received in anthropology, years of teaching experience, and level of certification.

Another interpretation, similar to the first, is that the teacher training was not sufficiently specific because the Project did not have an idealized model of teacher behavior. This is true. While the pupil materials are written in a narrative and expository manner, the suggestions in the teacher guide include not only suggestions for expository teaching, but also for a range of teacher behavior which might best be described as "conventional." This approach was taken because it was assumed that the material developed by the Project should not be restricted to one teaching style, but rather should be adapted to a range of teaching behavior. The doctrine of individual differences among children has often obscured the equally important fact that there are individual differences among teachers in the way they approach teaching. Because of the plasticity of the human learner to adapt to different learning conditions, there is no need to posit, in absence of evidence, superiority of method. If we had recommended a method, it would be more closely akin to a Herbartian than to an inquiry model. But in view of the prevailing Zeitgeist, such a method would have been denounced as mere formalism. The route was taken on leaving it up to a trained as well as unt ained teacher to do whatever he thought appropriate as far as classroom implementation. The teaching guides were not intended, and were not followed, as a teaching script.

A theoretical consideration of four teaching factors helps explain why special training in project materials does not enhance pupil

performance. These factors I call T, K. P, and C. Only the P-factor is unique to teacher training, and it is probably the least important factor related to pupil performance.

T. Notwithstanding the fact that admission to the profession of teacher is controlled by licensing based upon completion of approved sequences in teacher education, the qualitites of teacher are not restricted to the graduates of teacher-training institutions. To teach, in its simplest Anglo-Saxon meaning, is to show or to tell, and in this sense all humans are teachers. Because the direction of enculturation is from one who knows the culture toward one who is acquiring the traits and knowledge of the culture, the general direction is from an older teacher to a younger learner. Now notice I said older, not adult. If you have ever taught three year olds, for example, you will recall that to have a five year old on hand is a veritable childfall. He can show the desired behavior, an advantage which techniques of multi-grading among children have long utilized. By the time a prospective teacher enters a course of professional teacher training, he has learned a lot about teaching. He has learned it from his parents and other adults, from his peers, in school, and by engaging in many acts of teaching.

All persons, therefore, with variations due to age, possess a general factor of teaching ability, independent of specialized training in teaching. The T factor may be regarded as analogous to the g factor in intelligence. T may be regarded as a constellation of non-additive but interrelated traits. T consists of the following:

1. clarity in language use
2. preciseness in defining and evaluating learning tasks
3. efficiency in utilizing time for learning
4. skill in structuring new knowledge
5. skill in relating previous knowledge to defined learning task

K. The knowledge factor of specialized subject matter, whether verbal or motor, is denominated K in relation to T is similar to an achievement test score to g. Both professional teachers and non-professional teachers possess K. Of all teaching compoments, K is most subject to quantifiable measurement, but high K, independent of T, in itself does not guarantee teaching efficiency. However, the importance of K varies with the age of the learner. A six year old, compared to an adult, is at no disadvantage in talking with a two-year old, because K is not essential; however, K is a prerequisite if a geographer is to communicate substantive geography to a young adult.

P. Trained teachers are supposed to be specialists in the adaptation of knowledge about the child as a learner to the art of teaching. This is an area in training institutions which is most frequently covered by the categories of child development, methodology, and teaching strategies. Since these aspects are emphasized in pedagogy, the symbol

P is used. It should be noted, however, that the P is no longer reserved to the professional teacher. Many general undergraduate courses introduce students to P-type information and skills so that P tends to blur with T. Furthermore, there is little evidence to indicate how P makes a difference; much of P is of an informational nature, and is not functionally operational in changing pupil behavior.

C. Teaching takes place within a classroom environment, which is set primarily by the personality of the teacher as a reflection of her idealization of the teaching situation and adjustment with the desires of the school administration. Classroom environment may be classified as CS, structured, and CU, unstructured, depending on the specificity with which the teacher plans the teaching outcomes and controls the intervening pupil behavior. No classroom environment is wholly structured, but they permit a conceptualization of different emphasis.

In applying these four traits to an evaluation of pupil performance and teacher training in the Anthropology Curriculum Project, the following may be observed:

T. There was no special effort in the Project to improve T. If T is the most important teaching variable for the instruction of young learners, the institute would have made little difference on the relative competencies of trained and untrained teachers.

K. There was an effort to improve K, or knowledge of anthropology. In fact, most of the effort in the training was directed toward this objective. Most of the teachers who took the anthropology courses received satisfactory grades. K, however, appears to be significant in proportion to the age of the learner. After all, the evaluation of the institute was not made on what the teachers knew, but on what pupils knew as a result of instruction. The evaluation instruments were content valid with respect to the concepts and details presented in the pupil materials, not in the content of the teacher training. Furthermore, each untrained teacher had access to the same background teacher essays as had the trained teachers. There was nothing so technical in the material that a layman of ordinary intelligence could not have acquired a cognitive frame of reference to make the appropriate comparisons, recall the necessary information, and make applications to related cultures. The provision of the teacher essays to the untrained teachers reduced differences in K. In assisting pupils to learn elementary anthropology, T is probably more important than K.

P. There was an effort to improve P, or applied Pedagogy. Teachers discussed methods of teaching, examined concepts, made applications, compiled activities, and reviewed books, films, and filmstrips. This activity was always content and unit specific. The results of this

work, and similar effort, was compiled in a guide. The guide was made available to the untrained as well as trained teachers, and probably tended to minimize, for those who made maximum use of it, differences in the Pedagogical efficacy of the trained and untrained teachers. It is likely that many approved P-type activities, as the Thomas study of programed and conventional instruction, are not operationally functional with respect to pupil performance. Pupil performance on the anthropology achievement tests require language responses in the form of multiple-choice options, requiring language association even when presented pictorially. Classroom activities dear to the heart of the elementary teacher may be necessary to get through a long school day, but may be disfunctional in terms of language development. Making felt yurts may be a fun activity, but it may have little to do with the pupil performance we measure on the tests.

C. There was no attempt to establish a particular classroom environment, either structure or unstructured. It is the assumption that preferences for CS or CU were applied to unit teaching according to previously established behavioral patterns and were independent of the training factor. Hence the C factor is a neutral variable in comparing the pupil performance of trained as compared with untrained teachers. The Myer's study, however, suggests that CS environments might be somewhat more conducive to young children learning anthropology than CU environments. From a theoretical standpoint, T increases in importance as C is unstructured, with P becoming less significant.

Any Project begins with certain value assumptions. One of these, it will be seen, was in the definition of utility. Project evaluation confirmed the a priori definition of utility, i.e., the ability of teachers to teach elementary anthropology without specialized training.

This is as it should be. Complex and esoteric materials, requiring much pre- or in-service training, are uneconomic for competitive classroom diffusion. Where used, they often merely exaggerate the differences already prevailing between have and have-not schools.

In a substantive model, classroom teachers are not ignorant sinners waiting to be rescured by the college missionary or system supervisor with project training. Most teachers, like college professors, are average in ability. If provided with reasonably well organized materials which light some new idea or frontier of learning, they will do a reasonably competent job, as measured by pupil performance. They have the capacity to acquire the language of the new material. In the social studies, learning is introduced and developed, as in most of school life, through language. The untrained teacher has the same capacity to acquire and use the language as the trained teacher. Teachers have been repeatedly

told that they require in-service education before they can use new materials. I am not surprised at the negative reaction teachers often give to the introduction of new materials---they are supposed to dumb, and they react in the anticipated, unenthusiastic fashion. The self-fulfilling prophecy.

The evidence from the Anthropology Project indicates that the intensive training of teachers in the subject matter of anthropology and in the use of the materials does not bring about educationally significant pupil performance when compared with the performance of pupils taught by teachers who have not received the special training. This evidence is supported by an explanatory four-factor teaching model. Following the rule of parsimonious application of resources. I interpret this data to mean that special teacher training is not a prerequisite to successful use of the material, as measured by pupil performance.

Other projects may place more emphasis on teacher behavior as a curriculum product, in which teacher process is more important than pupil learning. And that raises questions of different performance criteria alien to the substantive model.

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